Volunteer Lake Assessment Program Individual Lake Reports

LAUREL LAKE, FITZWILLIAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	768	**Max. Depth (m):**	14.1	**Flushing Rate (yr^{1})**	0.4
Surface Area (Ac.):	155	**Mean Depth (m):**	6.1	**P Retention Coef:**	0.78
Shore Length (m):	3,500	**Volume (m^{3}):**	3,826,000	**Elevation (ft):**	1099

TROPHIC CLASSIFICATION

Year	Trophic class
1992	MESOTROPHIC
2006	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

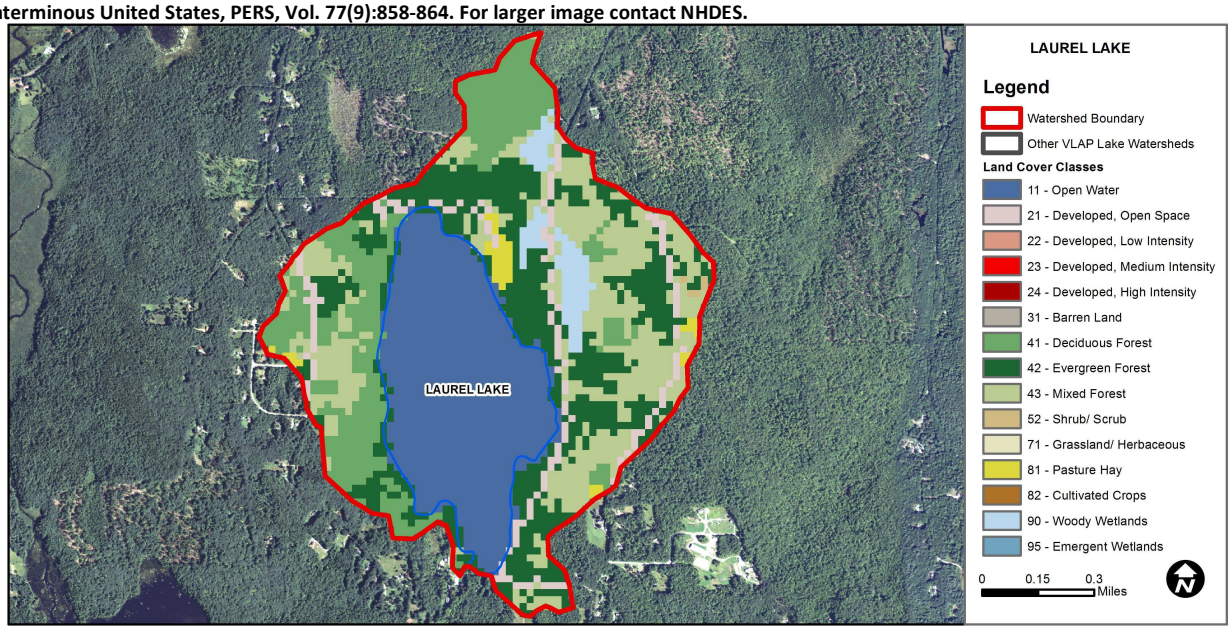
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAUREL LAKE - CAMP FLEUR DE LIS BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
LAUREL LAKE - TOWN BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	28.0	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	5.42	Deciduous Forest	17	Pasture Hay	1.46
Developed-Low Intensity	0	Evergreen Forest	23.68	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	20.99	Woody Wetlands	3.44
Developed-High Intensity	0	Shrub-Scrub	0.17	Emergent Wetlands	0

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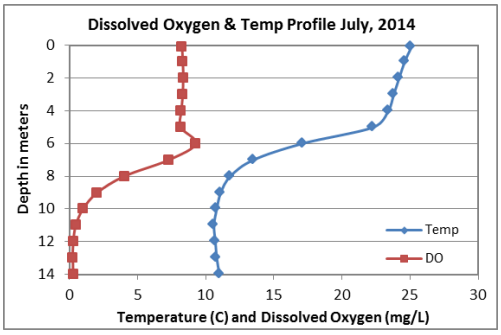
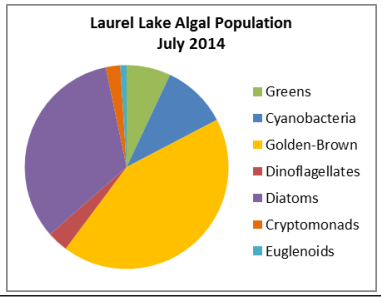
2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were low in June, increased slightly in July and then decreased in August. Average chlorophyll levels were low and less than the state median. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began. We hope to see this continue!
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels were approximately equal to the state medians and remained stable throughout the summer. Historical trend analysis indicates significantly decreasing (improving) epilimnetic (upper water layer) conductivity since monitoring began. We hope to see this continue!
- **E. coli:** Tributary and beach E. coli levels were low on each sampling event and much less than the state standards for of 88 cts/100 mL for public beaches and 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic and metalimnetic (middle water layer) phosphorus levels remained stable and low from June through August. Average epilimnetic phosphorus increased from 2013 but was less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus was elevated in August and the turbidity was also slightly elevated. This suggests that as the summer progressed and dissolved oxygen levels decreased below 1.0 mg/L in the hypolimnion, phosphorus was released from bottom sediments, a process called internal loading. Keene Ave Trib. and Before Lake phosphorus levels were elevated in July but within an average range for that station.
- **Transparency:** Transparency measured without the viewscope (NVS) improved (increased) from June to August and was better than the state median. Transparency measured with the viewscope (VS) worsened (decreased) from June to August but was also better than the state median and that measured without the viewscope. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **Turbidity:** Epilimnetic and metalimnetic turbidities remained low from June through August. Hypolimnetic turbidity was slightly elevated in August likely due to the accumulation or organic compounds as the summer progressed and dissolved oxygen levels were depleted in the hypolimnion. Keen Ave Trib. And Before Lake turbidities were low.
- **pH:** Epilimnetic pH was within desirable range 6.5-8.0 units on each sampling event. Historical trend analysis indicates stable epilimnetic pH since monitoring began. Metalimnetic pH was slightly above average in June potentially due to a layer of algae at that depth. Hypolimnetic, Keene Ave Trib. and Before Lake pH levels were less than desirable.
- **Recommended Actions:** The improving chlorophyll and conductivity trends are encouraging. Epilimnetic phosphorus and pH levels also appear to be improving, although not significantly. Lake and watershed residents should continue efforts to reduce nutrient loading to the lake through utilizing phosphate free fertilizers, planting native shoreline vegetation, and reducing stormwater runoff from their properties. Keep up the great work!





NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for LAUREL LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	3.57	2.37	8	45.8		6	5.93	6.36	0.38	6.64
Metalimnion				46.4		6			0.59	6.70
Hypolimnion				48.2		15			1.40	5.97
Keene Ave Trib.			7	39.9	10	43			1.04	5.21
Keene Ave Trib. Before Lake			8	44.0	30	48			0.92	5.28
North Beach					5					
Swim Club					5					

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Improving	Data significantly decreasing.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.